

Instructions For Completing A Source Water Delineation And Assessment Report (SWDAR) And PWS-6 Report For Transient Public Water Supplies

(Revised 05/15/2007)

Source Water Delineation and Assessment Reports (SWDAR) for transient public water supplies do not need to exceed one or two pages of text. The report should include the sections outlined below and must adequately describe the water supply, the aquifer or surface water source, and potential sources of regulated contaminants. In this case, regulated contaminants include only microbiological contaminants and nitrate. In addition to the text pages, several simple maps should be included to show the well(s), buildings, water distribution system, sewage disposal, roads, source water protection regions (described below – Table 1), general land uses, and potential sources of regulated contaminants (See Attached Example Report). If a well log is available, a copy should also be included with the report (**Note-well log must be submitted before final approval can be given**). Reports should be written to show existing AND proposed development features. For more information and guidance on contact the Source Water Protection Program at (406) 444-6697. Another resource to help you create maps of potential contaminants to include in the PWS-6 report is the Spatial Query and Mapping System (see: <http://nris.state.mt.us/mapper/>).

SWDAR Outline

1. **INTRODUCTION AND PURPOSE:** Include the public water supply (PWS) name, address, primary contact person, telephone number, and date of report. Identify who completed this report and include contact information.
2. **PWS INFORMATION:** Describe the location and nature of the water supply (i.e. restaurant, bar, campground, etc). If this is a new source at an existing PWS, describe why it is needed. Identify how many individuals the PWS will serve and the actual or projected water demand in gallons per day, assuming 10 gallons per day per patron (EPA, 1991). Describe the location of the well or surface water intake with respect to the on-site sewage treatment system components (septic system). Show the exact location of the septic system, mixing zones, and parcel boundaries for this property and neighboring properties on the map.
3. **DELINEATION:** Use Table 1 to determine which set of source water protection regions are required for the water supply. Show the boundary of the inventory region on the map. Describe the aquifer or surface water source sufficiently to assign a sensitivity rank (see Table 2). For wells, list depth, perforated interval, static water level, pumping water level, yield, and lithology of nearby wells (attach logs if available). Describe source water quality if data are available.
4. **INVENTORY:** Describe all features within the control zone. Describe general land uses within the inventory region. On the map, show detailed control zone plan. In inventory region, show general land uses described as: sewer residential, sewer commercial, sewer mixed, unsewer residential, unsewer mixed, unsewer commercial, industrial, railroad right-of-way, highway right-of-way, agricultural dryland crop, agricultural irrigated crop, agricultural irrigated pasture, agricultural dryland pasture, or forest. Table 3 shows land use codes that can be used on the map. You can use the Montana Mapper to build a map showing septic system density within the inventory region. Show animal feeding operations, sanitary sewers, stormwater conveyances, and other potential sources of microbial contaminants or nitrate. Use Table 4 to help identify significant potential sources of microbes and nitrate. Use Table 5 to list each source.
5. **SUSCEPTIBILITY:** Describe the threat the contaminant sources identified in your inventory pose to the new well. The following procedure is an example of a simple susceptibility analysis that can be used. Use of this procedure is encouraged but not required.

Use Table 6 to assign a hazard rating for each potential contaminant source you've listed in Table 5. See Appendix J (Section F4 and Tables J6 & J7) in the MT SWPP document for additional guidance.

Use Table 7 and information from Appendix J (Section F4) to help you identify natural or man-made barriers for each source and to assign susceptibility ratings for each source listed in Table 5.

In the text, describe any other source water protection efforts that will be used to address and minimize the susceptibility ratings listed in Table 5. Finally, discuss water treatment measures already being used by the PWS.
6. **LIMITATIONS**
Identification of potential contaminant sources is limited to those regulated for this class of PWS and is generally based on readily available information and reports. Unregulated activities or unreported contaminant releases may not be considered in this report. The delineation method utilizes simplifying assumptions that may not fully represent complex ground water flow systems but is intended to be conservative and protective of public health.
7. **REFERENCES:** Include a list of references used to prepare the report. See Table 9 for the suggested format.

Support Figures

Table 1. Methods and criteria for delineating source water protection regions for PWSs.

If Your Source of Water Is:	Delineate These Water Protection Regions	Method For Each Region:	Minimum Distance Values & Type of Inventory Required: LU – Land Uses; P&N – Pathogens and Nitrate sources
1. Ground Water that is:			
• Unconfined/Semi-confined*,	Control Inventory	Fixed radius Fixed radius	Distance - 100 feet Distance - 1 mile
• Confined	Control Inventory	Fixed radius Fixed radius	Distance - 100 feet Distance - 1000 feet
*Ground Water that is hydraulically Connected to Surface Water	Buffer Zone	Fixed Distance	One-half mile buffer extending upstream a distance corresponding to a 4-hour TOT but not to exceed ten miles or the nearest intake. Buffer will not exceed the extent of the watershed.
Surface water	Spill Response	Fixed Distance	One-half mile buffer extending upstream a distance corresponding to a 4-hour TOT but not to exceed ten miles or the nearest intake. Buffer will not exceed the extent of the watershed.

Table 2. Source Water (Aquifer) Sensitivity Table.

<u>High Source Water Sensitivity</u>	<u>Moderate Source Water Sensitivity</u>	<u>Low Source Water Sensitivity</u>
<ul style="list-style-type: none"> ▪ Surface water and GWUDISW ▪ Unconsolidate Alluvium (unconfined) ▪ Fluvial-Glacial Gravel ▪ Terrace and Pediment Gravel ▪ Shallow Fractured or Carbonate Bedrock 	<ul style="list-style-type: none"> ▪ Semi-consolidated Valley Fill sediments (semi-confined) ▪ Unconsolidated Alluvium (semi-confined) 	<ul style="list-style-type: none"> ▪ Consolidated Sandstone Bedrock ▪ Deep Fractured or Carbonate Bedrock ▪ Semi-consolidated (confined)

Table 3. Land Use Types and Map Codes.

Land Use Type	Map Code	Land Use Type	Map Code
Sewered residential	SR	Industrial	I
Sewered commercial	SC	Railroad right-of-way,	RRW
Sewered mixed	SM	Highway right-of-way	HRW
Unsewered residential	UR	Agricultural dryland crop	ADC
Unsewered mixed	UM	Agricultural irrigated crop	AIC
Unsewered commercial	UC	Agricultural irrigated pasture	AIP
		Agricultural dryland pasture	ADP
		Forest	F

Table 4. Identification of Significant Potential Sources of Microbiological and Nitrate Contamination.

Potential contaminant sources are designated as significant if they fall into one of the following categories:

- 1) Animal feeding operations.
- 2) Wastewater treatment facilities, sludge handling sites, or land application areas.
- 3) Septic systems.
- 4) Sewer mains.

Table 5. (MT SWPP Table 5) Significant potential contaminant sources for *enter PWS name. (Examples included)*

Source	Contaminants	Description (<i>Location and nature of hazard</i>)	Hazard Rating	Barriers	Susceptability
<i>Animal Feeding Operation</i>	<i>Pathogens and Nitrates</i>		<i>Moderate</i>		
<i>Sanitary Sewer Main</i>	<i>Pathogens and Nitrates</i>				
<i>Septic Systems</i>	<i>Pathogens and Nitrates</i>				
<i>Waste Water Treatment Plants and Waste Disposal Sites</i>					

Table 6a. (MT SWPP Table 6) SURFACE WATER SOURCES: Hazard of potential contaminant sources.

Potential Contaminant Source	High Hazard	Moderate Hazard	Low Hazard
Point Sources	Potential for direct discharge to Source Water	Potential for discharge to GW that is hydraulically connected to SW	Potential contaminant sources present within the watershed
Septic Systems	More than 300 per sq. mi.	50 – 300 per sq. mi.	Less than 50 per sq. mi.
Municipal Sanitary Sewer (percent land use)	More than 50 percent of region	20 to 50 percent of region	Less than 20 percent of region
Cropped Agricultural Land (percent land use)	More than 50 percent of region	20 to 50 percent of region	Less than 20 percent of region

Table 6b. (MT SWPP Table 6) UNCONFINED AQUIFERS: Hazard of potential contaminant sources.

Potential Contaminant Source	High Hazard	Moderate Hazard	Low Hazard
Point Sources	Within 1 year TOT	Between 1 to 3 years TOT	Over 3 years TOT
Septic Systems	More than 300 per sq. mi.	50 – 300 per sq. mi.	Less than 50 per sq. mi.
Municipal Sanitary Sewer (percent land use)	More than 50 percent of region	20 to 50 percent of region	Less than 20 percent of region
Cropped Agricultural Land (percent land use)	More than 50 percent of region	20 to 50 percent of region	Less than 20 percent of region

Table 6c. CONFINED AQUIFERS (modified from MT SWPP Table 6): Hazard of potential contaminant sources.

Potential Contaminant Sources	The PWS well is not sealed through the confining layer	Other wells in the inventory region are not sealed through the confining layer	All wells in the inventory region are sealed through the confining layer
Point Sources*	High	Moderate	Low
Septic Systems* (# per square mile)	High: > 300 Moderate: 50 to 300 Low: < 50	Moderate: > 300 Low: < 300	Low
Sanitary Sewer (% land use)	High: > 50 Moderate: 20 to 50 Low: < 20	Moderate: > 50 Low: < 50	Low
Cropland (% land use)	High: > 50 Moderate: 20 to 50 Low: < 20	Moderate: > 50 Low: < 50	Low

* septic systems that serve something other than

Table 7. (MT SWPP Table 5). Relative susceptibility to specific contaminant sources as determined by hazard and the presence of barriers.

Presence Of Barriers	Hazard		
	High	Moderate	Low
No Barriers	Very High Susceptibility	High Susceptibility	Moderate Susceptibility
One Barrier	High Susceptibility	Moderate Susceptibility	Low Susceptibility
Multiple Barriers	Moderate Susceptibility	Low Susceptibility	Very Low Susceptibility

Table 9. Suggested format for listing references.

Author Name, Date of Publication, Title of Report or Document: Publication Source and Report or Volume Number, page number.

Example:

- Kendy, E., and R.E. Tresch, 1996, Geographic, Geologic, and Hydrologic Summaries of Intermontane Basins of the Northern Rocky Mountains, Montana: U.S. Geological Survey Water Resources Investigations Report 96-4025, 233 p.
- Morrison – Maierle, Inc., 1980, Flower Creek Basin Flower Creek Dam Libby, Montana, MT-1458, 23 p.

Example Transient PWS-6 Report

Source Water Delineation and Assessment Report

Public Water Supply: Montana City Grill and Saloon (PWSID #02971)

Report Date: May 16, 2007
Contact Person: Tom Odamo
4 Highway 15
Clancy, MT 59634
(406) 449-8890

Introduction

This delineation and assessment report is intended to meet the technical requirements of the Montana Source Water Protection Program (DEQ, 1999) and the federal Safe Drinking Water Act (SDWA) Amendments of 1996 (P.L. 104-182). Russell Levens, Hydrogeologist with the Montana Department of Environmental Quality (DEQ) prepared the final report. Most of the information on land use and potential contaminant sources comes from a draft Wellhead Protection Plan for Montana City Schools prepared by the Montana Bureau of Mines and Geology (MBMG, 1998). Information on the well and vicinity comes from a sanitary survey completed in March 1996 by McNenny Environmental Engineering and Consulting (available from DEQ upon request).

Purpose

The purpose of this delineation and assessment report is to assess threats to the Montana Grill and Saloon water supply using information obtained from local residents familiar with the surrounding area and published reports. Delineation is a process whereby areas that contribute water to aquifers or surface waters used for drinking water, called source water protection areas, are identified on a map. Assessment involves identifying locations or regions in source water protection areas where contaminants may be generated, stored, or transported and then determining the potential for contamination of drinking water by these sources.

Public Water Supply Information

Montana City Grill and Saloon is a restaurant and lounge located west of the Montana City I-15 interchange. DEQ public water supply records indicate the water system serves 125 non-residents through one service connection. Montana City Grill and Saloon is classified as a transient, non-community public water supply because they serve 25 or more persons per day but do not regularly serve the same persons for at least six months a year. Water demand is approximately 1,250 gallons per day assuming 10 gallons per day per patron (EPA, 1991). The well is located northwest of the building. Sanitary wastes go to a septic system located south of the building.

Limestone of the Meagher Formation underlies the vicinity of Montana City Grill and Saloon (MBMG, 1998). According to the water system operator, water for the establishment is drawn from a 234 foot deep well drilled in 1979. A submersible pump draws water from the 6-inch diameter well casing. A captive air pressure tank and water softener are located in a crawl space under the west end of the building. No treatment other than softening is applied.

No well log is available for the public water supply well, however there is a well log from a 250-foot deep well drilled nearby (well log attached). The nearby well is perforated from 170 feet to total depth and has a static water level of 110 feet. Well yield listed on the attached log is 40 gallons per minute at 135 feet of drawdown. There are no apparent clay or shale confining layers beneath the site so the aquifer is classified as a shallow fractured or carbonate aquifer with high sensitivity hydrogeologic setting.

Montana City Grill and Saloon is required to monitor for nitrate and coliform bacteria. Nitrate levels detected in the public water supply well within the past five years have ranged from 1.12 to 1.78 mg/L, well below the maximum concentration level of 10 mg/L. Coliform bacteria have been detected in routine and repeat sampling resulting in two health advisories in the past five years.

Delineation

A 100-foot radius control zone and one-mile radius inventory region were delineated for Montana City Grill and Saloon as required for transient, non-community public water supplies under the Montana Source Water Protection Program (DEQ, 1999). The control zone is the most critical area within which direct introduction of contaminants into the well or immediate area can occur. The Inventory Region encompasses the area that water or contaminants can flow to Montana City Grill and Saloon's well over a period of months to years.

Inventory

The Montana Source Water Protection Program (DEQ, 1999) requires that land uses and all potential sources of nitrate and microbial pathogens be identified within the control zone and inventory region of non-community, transient public water supplies.

According to the information in the most recent sanitary survey for Montana City Grill and Saloon there are no potential sources of pathogens or nitrate in the control zone.

The following inventory for the Montana City Grill and Saloon inventory region is summarized from information presented in the Draft Wellhead Protection Plan for Montana City School (MBMG, 1998). MBMG based their inventory on review of the East Helena 7.5-minute topographic map and an aerial photograph, review of existing databases available through DEQ, and field verification.

Montana City is a rapidly developing bedroom community for Helena. Land use in the vicinity of Montana City Grill and Saloon is primarily undeveloped dryland pasture and unsewered residential areas developed in one to five acre lots. A few other small businesses and the rights-of-way for Interstate 15 and State Highway 518 also are within one mile of the public water supply well. A gas station, print shop, beauty salon, kennel, dentist office, car wash, bank, and automotive transmission repair shop are among the nearby businesses. A commercial subdivision northeast of the public water supply has been approved. No information regarding the tenants of the commercial subdivision is available.

There are no animal feeding operations or sanitary sewer mains within one mile of the Montana City Grill and Saloon. Therefore, the only apparent significant potential sources of nitrate or pathogens are septic systems.

Susceptibility Assessment

Susceptibility of the Montana City Grill and Saloon as defined in the Montana Source Water Protection Program is very high for pathogens and moderate for nitrate. The Montana City Grill and Saloon public water supply may be considered a candidate for mandatory disinfection under the proposed Ground Water Rule because they have a recent history of coliform bacteria violations and because their well is completed in a sensitive hydrogeologic setting.

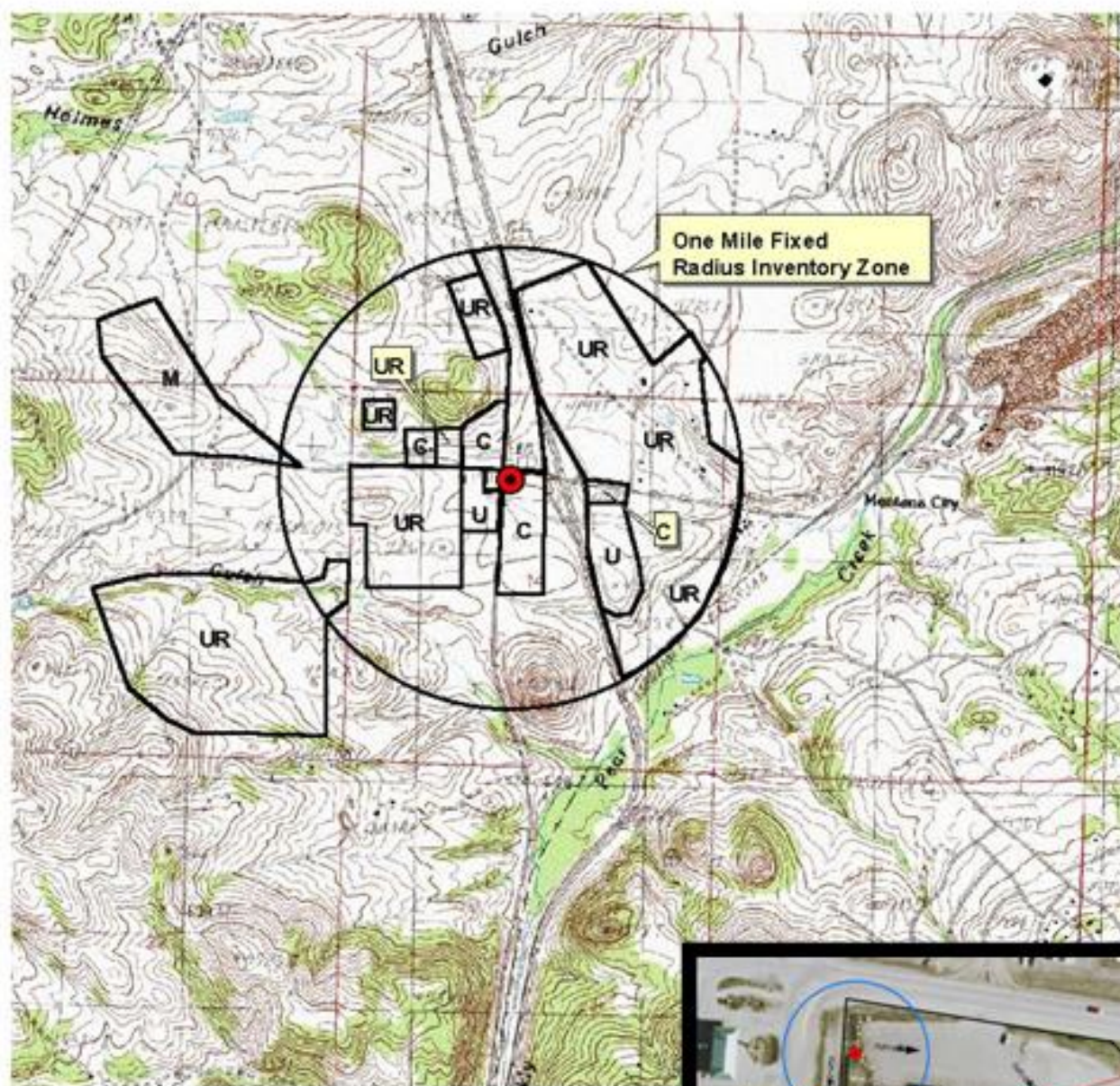
References:

Montana Bureau of Mines and Geology, 1998. Draft Wellhead Protection Plan for Montana City School.

Montana DEQ, 1999. Montana Source Water Protection Program, Approved by EPA in November 1999.

U.S. EPA, Office of Water, 1991. Manual of Small Public Water Supply Systems, EPA 570/9-91-003, 211 p.

PWS-6 Transient Non-Community PWS Inventory Zone and Land Use



UUndeveloped
 URUnsewered Residential
 CCommercial
 M.....Mine Site
 ●New Well Location



GWIC Well Log Report

Montana Bureau of Mines and Geology
Ground-Water Information Center

Owner and Location Information

Site Name:

GWIC Id:58707
Location (TRS):09N 03W 14 B
County (MT):JEFFERSON
DNRC Water Right:1049
Certificate of Survey:Not Reported
Block:Not Reported
Lot:Not Reported

Source of Data:LOG
Latitude (dd):46.5404
Longitude (dd):-111.9506
Geomethod:TRS-TWN
Datum:1927
Addition:Not Reported
Subdivision:Not Reported

Well Construction and Performance Data (measurements are reported below land surface)

Total Depth (ft):250.00
Static Water Level (ft):110.00
Pumping Water Level (ft):245.00
Yield (gpm):40.00
Test Type:AIR
Test Duration:1.00
Drill Stem Setting (ft):
Recovery Water Level (ft):
Recovery Time (hrs):

How Drilled:ROTARY
Driller's Name:LINDSAY
Driller License:WWC038
Completion Date:Oct 15,1980
Special Conditions:None Reported
Is Well Flowing?:No
Shut-In Pressure:
Well/Water Use:DOMESTIC
Geology/Aquifer:Not Reported

Casing Information

Perforation/Screen Information

From	To	Diameter	Type	From	To	Diameter	Description
0	162.0	6.0	STEEL	170.0	250.0	4.02	X5/16
132.0	250.0	4.0	PVC				

Lithology Information

From	To	Description
0	3.0	TOPSOIL
3.0	150.0	SUGAR LIMESTONE
150.0	250.0	LIMESTONE BEDROCK